

# REPORT DOCUMENTATION PAGE

Form Approved  
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

|  |  |   |  |  |  |
|--|--|---|--|--|--|
| 1. AGENCY USE ONLY (Leave blank)   |  | 2. REPORT DATE  |  | 3. REPORT TYPE AND DATES COVERED<br>MONOGRAPH              |  |
| 4. TITLE AND SUBTITLE<br>KEEPING YOUR DEE IN THE FIGHT: AN EVALUATION OF<br>SYNCHRONIZATION AND DECISION-MAKING  |  |   |  | 5. FUNDING NUMBERS   |  |
| 6. AUTHOR(S)<br>MAJOR JOHN C. DEJARNETTE   |  |   |  |  |  |
| 7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)<br>School of Advanced Military Studies<br>Command and General Staff College<br>Fort Leavenworth, Kansas 66027 |  |   |  | 8. PERFORMING ORGANIZATION<br>REPORT NUMBER                |  |
| 9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)<br>Command and General Staff College<br>Fort Leavenworth, Kansas 66027                                 |  |   |  | 10. SPONSORING / MONITORING<br>AGENCY REPORT NUMBER        |  |
| 11. SUPPLEMENTARY NOTES  |  |   |  |  |  |
| 12a. DISTRIBUTION / AVAILABILITY STATEMENT<br>APPROVED FOR PUBLIC RELEASE.<br>DISTRIBUTION UNLIMITED.<br>UNLIMITED   |  |   |  | 12b. DISTRIBUTION CODE                                     |  |
| 13. ABSTRACT (Maximum 200 words)<br>SEE ATTACHED   |  |   |  |  |  |
| 14. SUBJECT TERMS  |  |   |  | 15. NUMBER OF PAGES<br>52                                  |  |
|  |  |   |  | 16. PRICE CODE   |  |
| 17. SECURITY CLASSIFICATION<br>OF REPORT<br>UNCLASSIFIED   |  | 18. SECURITY CLASSIFICATION OF THIS<br>PAGE<br>UNCLASSIFIED |  | 19. SECURITY CLASSIFICATION<br>OF ABSTRACT<br>UNCLASSIFIED |  |
|  |  |   |  | 20. LIMITATION OF ABSTRACT<br>UNLIMITED                    |  |

20020419 163

## ABSTRACT

KEEPING YOUR DOG IN THE FIGHT: AN EVALUATION OF  
SYNCHRONIZATION AND DECISION-MAKING by MAJ John C. DeJarnette, USA,  
47 pages.

This monograph examines the relationship between battlefield synchronization and decision-making. Beginning with a review of rational analytical decision theory and Gary Klein's recognition primed decision theory, the monograph reviews the Military Decision Making Process (MDMP) to determine if the MDMP and its resultant products are sufficient to achieve and maintain synchronization of the effects of distributed operations. In addition to the detailed review of the MDMP, this monograph considers the relationship between complexity, uncertainty, and synchronization.

Klein's recognition primed decision-making (RPD) theory, based on extensive study of fire fighters, emergency medical service workers, and military commanders describes the intuitive manner which experienced people most frequently use to solve problems. RPD is a rapid process that foregoes extensive analysis to generate feasible solutions. When employing RPD techniques, decision-makers filter environmental cues and create a solution hypothesis using an analogy or a metaphor. This hypothesis is then tested using mental simulation to ensure it is acceptable. RPD is very effective when the decision-maker has substantial expertise in solving the type of problem at hand, however it is adversely affected by uncertainty, ambiguity and complexity. RPD seeks satisfactory, rather than optimal, solutions.

Rational analysis is a common alternative to RPD, seeking optimal solutions through deliberate, detailed analysis. Rational analysis provides the theoretical underpinnings of the MDMP. Rational analysis is a linear procedure used to solve complex, interdisciplinary problems that exceed the expertise of any single decision-maker. Rational analysis is a time consuming process because of the sequential nature of analysis and decision. Because it is a group process it is vulnerable to errors of miscommunication and misperception. However, rational analysis and RPD are complementary approaches to problem solving because rational analysis can generate synthetic experience to support RPD based decisions.

The MDMP is doctrinally describes as a rational analysis process. MDMP is a time consuming, sequential process that generates solutions through strict adherence to procedure. MDMP does not support effectively synchronization of effects because its linear, sequential approach inhibits a holistic solution to problem solving. Further, the products generated during the MDMP do not adequately address the identification of the decisive point and supporting the adjustment decisions required to maintain synchronization in the dynamic environment of combat.

This monograph concludes that the MDMP and RPD are complementary processes. It establishes that synchronization must be injected into MDMP during mission analysis, rather than during course of action analysis. It recommends that modifications to the MDMP to emphasize decision support products and changing the MDMP from a strictly linear, sequential model to a feedback based iterative procedure.

# **Keeping Your Dog in the Fight: An Evaluation of Synchronization and Decision-Making**

**A Monograph**

**by**

**Major John C. DeJarnette**

**United States Army**



**School of Advanced Military Studies  
United States Army Command and General Staff College  
Fort Leavenworth, Kansas**

AY 00-01

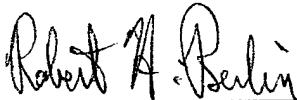
SCHOOL OF ADVANCED MILITARY STUDIES

MONOGRAPH APPROVAL

MAJOR John C. DeJarnette

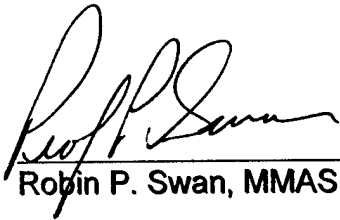
Title of Monograph: *Keeping Your Dog in the Fight: An Evaluation of Synchronization and Decision-Making*

Approved by:



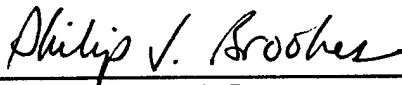
Robert H. Berlin, Ph.D.

Monograph Director



Robin P. Swan, MMAS

Director, School of Advanced  
Military Studies



Philip J. Brookes, Ph.D.

Director, Graduate Degree  
Program

Accepted this 15th Day of May 2001

# ABSTRACT

KEEPING YOUR DOG IN THE FIGHT: AN EVALUATION OF  
SYNCHRONIZATION AND DECISION-MAKING by MAJ John C. DeJarnette, USA,  
47 pages.

This monograph examines the relationship between battlefield synchronization and decision-making. Beginning with a review of rational analytical decision theory and Gary Klein's recognition primed decision theory, the monograph reviews the Military Decision Making Process (MDMP) to determine if the MDMP and its resultant products are sufficient to achieve and maintain synchronization of the effects of distributed operations. In addition to the detailed review of the MDMP, this monograph considers the relationship between complexity, uncertainty, and synchronization.

Klein's recognition primed decision-making (RPD) theory, based on extensive study of fire fighters, emergency medical service workers, and military commanders describes the intuitive manner which experienced people most frequently use to solve problems. RPD is a rapid process that foregoes extensive analysis to generate feasible solutions. When employing RPD techniques, decision-makers filter environmental cues and create a solution hypothesis using an analogy or a metaphor. This hypothesis is then tested using mental simulation to ensure it is acceptable. RPD is very effective when the decision-maker has substantial expertise in solving the type of problem at hand, however it is adversely affected by uncertainty, ambiguity and complexity. RPD seeks satisfactory, rather than optimal, solutions.

Rational analysis is a common alternative to RPD, seeking optimal solutions through deliberate, detailed analysis. Rational analysis provides the theoretical underpinnings of the MDMP. Rational analysis is a linear procedures used to solve complex, interdisciplinary problems that exceed the expertise of any single decision-maker. Rational analysis is a time consuming process because of the sequential nature of analysis and decision. Because it is a group process it is vulnerable to errors of miscommunication and misperception. However, rational analysis and RPD are complementary approaches to problem solving because rational analysis can generate synthetic experience to support RPD based decisions.

The MDMP is doctrinally describes as a rational analysis process. MDMP is a time consuming, sequential process that generates solutions through strict adherence to procedure. MDMP does not support effectively synchronization of effects because its linear, sequential approach inhibits a holistic solution to problem solving. Further, the products generated during the MDMP do not adequately address the identification of the decisive point and supporting the adjustment decisions required to maintain synchronization in the dynamic environment of combat.

This monograph concludes that the MDMP and RPD are complementary processes. It establishes that synchronization must be injected into MDMP during mission analysis, rather than during course of action analysis. It recommends that modifications to the MDMP to emphasize decision support products and changing the MDMP from a strictly linear, sequential model to a feedback based iterative procedure.

# TABLE OF CONTENTS

|  |    |
|--|----|
| TABLE OF CONTENTS .....                    | i  |
| INTRODUCTION .....                         | 1  |
| BACKGROUND .....                           | 1  |
| METHODOLOGY .....                          | 4  |
| DECISION-MAKING THEORY .....               | 6  |
| NATURALISTIC DECISION MAKING.....          | 6  |
| ANALYTICAL DECISION-MAKING .....           | 10 |
| SYNTHESIS OF DECISION-MAKING THEORY.....   | 13 |
| DECISIONS DETERMINE SYNCHRONIZATION .....  | 15 |
| THE MILITARY DECISION MAKING PROCESS ..... | 16 |
| MISSION ANALYSIS .....                     | 20 |
| COURSE OF ACTION DEVELOPMENT. ....         | 24 |
| COURSE OF ACTION ANALYSIS.....             | 28 |
| SUMMARY OF MDMP .....                      | 31 |
| FACTORS INFLUENCING SYNCHRONIZATION.....   | 32 |
| COMPLEXITY .....                           | 33 |
| UNCERTAINTY.....                           | 38 |
| RECOMMENDATIONS .....                      | 43 |
| BIBLIOGRAPHY.....                          | 48 |

## CHAPTER ONE

# INTRODUCTION

From the military point of view, combat actions even in future conflicts will have a local character...precise organization of the control and cooperation of forces is required.<sup>1</sup>

-General Makhmut Gareev, *If War Comes Tomorrow*

## BACKGROUND

Synchronization has long been recognized as a desirable characteristic of operational art. In the classic text *On War*, Clausewitz offered that conclusive victory comes from synchronized attack on the enemy's center of gravity; simultaneously bringing all forces to bear on the center of gravity results in both physical and moral collapse<sup>2</sup>. Jomini also articulated the concept of synchronization in his list of the "Fundamental Principles of War": "On the battlefield, to throw the mass of the forces upon the decisive point...to so arrange that these masses shall not only be thrown upon the decisive point, but that they shall engage at the proper times and with ample energy"<sup>3</sup>. From their observations of Napoleon, both Clausewitz and Jomini determined that employing distributed maneuver to direct overwhelming power against the enemy's decisive point was instrumental in victory. Their theoretical expression of concentration

---

<sup>1</sup> Makhmut Gareev, *If War Comes Tomorrow*, (London: Frank Cass, 1998), 123.

<sup>2</sup> Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton: Princeton University Press, 1984), 225-270, 577-637. Clausewitz develops the concept of synchronized attack in Book Four, "The Engagement". He establishes that physical destruction leads to tactical defeat, which in turn leads to moral collapse. At the tactical level "the direct annihilation of the enemy's forces must be the *dominant consideration* ...*tactical successes are of paramount importance in war.*" In Book Eight "War Plans" he establishes the concept of center of gravity as "the hub of all power and movement, on which everything depends" and offers that the enemy's forces generally comprise the center of gravity. From this definition he extols the virtues of concentric attack as a means to isolate and destroy the physical and moral potential of the foe. Concentric attack and distributed maneuver, as chronicled by Clausewitz, establish the roots of our modern concept of synchronization.

<sup>3</sup> Antoine H. Jomini, *Summary of The Art of War*, ed. J.D. Hiddle, in *Roots of Strategy Book 2* (Harrisburg:

of forces in space have evolved into the modern US Army doctrinal concept of synchronization.

Synchronization is one of the five tenets of Army operations. Taken together these tenets, agility, initiative, depth, synchronization, and versatility, provide the framework for planning and executing tactical and operational level warfare. Field Manual 100-5 *Operations* defines synchronization as:

Synchronization is arranging activities in time and space to mass at the decisive point. For example, integrating the activities of intelligence, logistics, and fire support with maneuver leads to synchronized operations...Synchronization seeks to gain overwhelming combat power... thus takes place first in the minds of commanders and then in the actual planning and coordination of movements, fires, and supporting activities.<sup>4</sup>

This definition is consistent with classical military theory and explicitly establishes a requirement for coordinated application of combat power against an enemy decisive point to gain conclusive advantage and achieve a tactical decision. However, *FM 100-5* cautions that coordinated actions are necessary but insufficient conditions for success. Synchronized operations evolve from a shared visualization of the commander's intent

---

Stackpole Books, 1987), 461.

<sup>4</sup> United States Army, *Field Manual 100-5 Operations* (Washington, D.C.: Department of the Army, 1993), 2-8. The essence of this definition is consistent with the definition of synchronization found in *ST 3-0 Operations* (Washington, D.C.: Department of the Army, 2000) and *Joint Publication 1-02 Department of Defense Dictionary of Military and Associated Terms*, (Washington, D.C.: Joint Staff, 1994) "The arrangement of military actions in time, space, and purpose to produce maximum relative combat power at a decisive place and time." Neither *ST 3-0* nor *Joint Publication 1-02* explicitly defines decisive point. *ST 3-0 Operations*, page 4-22 provides an allegorical concept through the definition of decisive operation: "Decisive operations conclusively determine the outcome of major operations, battles, and engagements." This monograph defines decisive point as the place and time where decisive action can occur, consistent with the definition of decisive operation. Therefore, the decisive point of an operation is dependent on the actions that occur or can occur with respect to both friendly and enemy disposition and intent. See also Clausewitz, *On War*, Book Four for further discussion of battle offered and battle declined relative to the decisive point.



for the operation and seek synergy of the individual elements of combat power directed against the enemy.<sup>5</sup>

Achieving synergy is substantially more difficult than simply sequencing offensive and defensive battlefield actions, yet synergy is precisely the goal of synchronization. Synchronized operations seek to present the enemy with diverse tactical problems faster than he can effectively respond; to generate both the physical and moral collapse espoused by Clausewitz and Jomini.<sup>6</sup> In practice synchronization is an elusive goal because of the fog and friction of battle. For example, United States Air Force Lieutenant Colonel Kent Laughbaum's study of deep battle during Operations DESERT SHIELD and DESERT STORM clearly states that synchronizing Army-Air Force operations was ineffective, resulting in lost opportunities to decisively engage the Iraqi Army.<sup>7</sup> LTC Laughbaum's observations about the difficulty in conducting synchronized operations are echoed in the after-action reviews from the Army's Combat Training Centers (CTC). Brigades and divisions training at the CTCs do not effectively synchronize the effects of fires, movement, intelligence, and logistical operations<sup>8</sup>. The relative inability of units to conduct synchronized operations indicates that the problem

---

<sup>5</sup> United States Army, *FM 100-5* (1993), 2-8. At the operational level of war, synchronization is achieved by massing the effects of distributed operations to gain tactical advantage. Synchronizing effects in time requires a flexible operational concept that includes branches and sequels to address enemy counteractions. The decisions that trigger execution of branches and sequels are the essential element of synchronization.

<sup>6</sup> Kevin S. Donohue, "The Dynamic Synchronization Matrix: An Automated Decision Support Tool for the Campaign Planning Staff", (School of Advanced Military Studies Monograph, US Army Command and General Staff College, 1994), 10-12.

<sup>7</sup> Kent Laughbaum, *Synchronizing Airpower and Firepower in the Deep Battle*, (Maxwell Air Force Base: Air University Press, 1999), 25-41. Laughbaum concludes that the theater CINC should establish mechanisms to ensure that inter-service deep and close operations are synchronized. He is highly critical of the current procedures for planning and controlling fires beyond the FSCL. LTC Laughbaum's criticisms are indicative of the problems associated with coordination and synchronization of actions in the same battle space.

<sup>8</sup> United States Army Combined Arms Center, *BCTP Perceptions '00*. n.p, [on-line]; available from [http://call.army.mil/call/ctc\\_bull/](http://call.army.mil/call/ctc_bull/); Internet; accessed 16 January 2001.

lies either with an ineffective doctrine, inappropriate application of that doctrine in training and execution, or a combination of both. Finding an appropriate method to conceive and describe synchronized operations is important as the Department of Defense continues to downsize force structure and reduce redundant capabilities. Smaller forces must effectively synchronize effects of their actions in order to defeat any competent foe.<sup>9</sup>

## METHODOLOGY

The fundamental research question is whether the current military decision-making process contributes to achieving synchronization of combat effects. The research question accepts the assertion that within the MDMP the synchronization matrix serves primarily as a tool for recording the results of course of action analysis and for preparing the operations order.<sup>10</sup> To answer the research question, it is necessary to determine if the products developed during the steps of the MDMP not only coordinate action in time and space, but also coordinate the purposes of the combat actions to achieve relative advantage at the decisive point. It must also be determined if the MDMP adequately supports development and communication of the commander's vision for the operation. Finally, it is required to determine if the MDMP and its resultant products balance

---

<sup>9</sup> This monograph focuses on synchronization of combat operations on land. For the purpose of synchronization, aviation fires are not differentiated by platform. Similarly, it is not necessary to differentiate between mounted and dismounted ground movement and fires. Finally, the principles addressed apply equally across the spectrum of operations, offense, defense, stability, and support operations.

<sup>10</sup> United States Army, *Field Manual 101-5 Staff Organization and Operations* (Washington, D.C.: Department of the Army, 1997), 5-19. *FM 101-5* indicates that the synchronization matrix "allows the staff to synchronize the COA across time and space in relation to an enemy COA...However, the passage of time between the creation of the synchronization matrix and the execution of operations...decreases the likelihood that the synchronization matrix will be correct." This author considers the synchronization matrix inadequate to describe coordinated action relative to the decisive point.

flexibility with specificity to allow successful execution of the plan in the dynamic, non-linear nature of warfare. The table below summarizes the research methodology for this monograph.

This monograph begins with a review of both recognition primed and rational analytical decision-making theories to establish a basis for evaluating the impact of decisions on synchronization during both planning and execution. Against this theoretical background, the Military Decision Making Process is explored to identify essential points where synchronization can be achieved or improved by explicit consideration of the impacts of complexity and uncertainty on both decision-making and synchronization. It concludes that the analytical Military Decision Making Process complements naturalistic decision-making by providing the necessary synthetic experience to support recognition-primed decision-making and to achieve synchronization. Finally, it recommends three modifications to the MDMP to improve synchronization. First, the decisive point or decisive action must be identified during mission analysis and visually portrayed on course of action (COA) development and decision support products to ensure synchronization. Second, mission analysis, COA development, COA analysis, and COA comparison should be treated as an iterative cycle to reflect actual practice and the influence of naturalistic decision-making. Finally, the intelligence preparation of the battlefield products, the decision support matrix (DSM), and the decision support template (DST) are essential products of MDMP. These products should emphasize adjustment decision and be communicated to subordinate commanders to focus their parallel planning and achieve synchronized effects from decentralized operations.

## CHAPTER TWO

### DECISION-MAKING THEORY

Synchronization implies judgment in choosing among simultaneous and sequential activities. Commanders make this distinction clear to their staffs and subordinate commanders...[this requires] mastery of time-space-purpose relationships, and a complete understanding of the ways in which friendly and enemy capabilities interact.<sup>11</sup>

*US Army Field Manual 100-5 Operations*

Effective synchronization depends heavily on timely and appropriate decision-making during both planning and execution of the operation. Decision-making is an iterative process that both informs and is informed by the act of planning. As an integral part of designing and prosecuting an operation, deliberate and implicit decisions bound the realm of feasible, suitable, and acceptable courses of action available to commanders. Achieving synchronization requires commanders and their staff officers to anticipate future decisions based upon a shared vision of the operation. To understand the importance of decision-making in prosecuting synchronized operations, it is necessary to consider the underlying theories of individual and group decision-making.

#### NATURALISTIC DECISION MAKING

Often there is a gap between principles and actual events that cannot always be bridged by a succession of logical deductions...in all doubtful cases stick to one's first opinion and refuse to change unless forced to do so by a clear conviction.<sup>12</sup>

*Carl von Clausewitz, On War*

MIT behavioral researcher Gary Klein's Recognition Primed Decisions (RPD) theory offers excellent insight into how leaders use a naturalistic, non-linear process to make decisions under stress<sup>13</sup>. RPD, developed partly as a result of a Department of the

---

<sup>11</sup> United States Army, *FM 100-5* (1993), 2-9.

<sup>12</sup> Carl von Clausewitz, *On War*, 108.

<sup>13</sup> Gary Klein, *Sources of Power: How People Make Decisions*, (Cambridge: The MIT Press, 1999).

Army sponsored study, is based on observation of experts in a wide variety of professions: firefighters, nurses, air crews, tank commanders, and helicopter pilots. RPD describes how experts make decisions under time pressure, and the significant consequences for selecting the wrong course of action. It represents the way commanders make tactical decisions. RPD theory demonstrates that experienced people base their decisions on recognizable fact patterns, rather than on an analytical process. In the absence of a clearly recognizable pattern, these experienced leaders base their decisions on analogous reasoning – determining which known pattern most closely resembles the current situation-- coupled with a mental simulation to assess the decision.<sup>14</sup> Clausewitz's words in the introductory epigraph lend credence to Klein's assertion that RPD models the manner in which commander's use their experience and intuition to make tactical decisions.

RPD is a rapid process that takes place in the mind of the decision maker. It is based on fact-pattern recognition to identify a satisfactory, but less than optimal, course of action to achieve the desired results – “satisficing.” Often the RPD-based decision depends screening inappropriate solutions by screening for the absence of significant facts. Defining what the problem is not can be as important as defining what it is. The experienced decision maker gains as much information by what they are not seeing as what they see.<sup>15</sup> Through this filtering process, the decision-maker narrows the range of

---

Klein's text focuses on intuitive decision making practices of experienced leaders under adverse conditions. His research is based on both observation and detailed interviews of leaders about how they make decisions. He presents several case studies, including study of AWACS crews and the *USS Vincennes* incident that validates his thesis and provide useful vignettes for training leaders to make decisions.

<sup>14</sup> Ibid., 52-57, 179, 204. These analogies can become stories used to communicate understanding to others.

<sup>15</sup> Ibid., 155-168. Klein expands this concept to include an experts' ability to make accurate judgments based on counter-intuitive inferences. This concept is important to staff officers recommending CCIR and

possible solutions by assessing the pattern cues and selecting an appropriate analogy or metaphor to describe the problem. To reach a decision, the decision-maker rationalizes any inconsistencies between the analogue on which he will base his decision and the available environmental pattern cues. He then conducts a mental simulation to test his hypothesis.<sup>16</sup>

Mental simulation, the decision-maker's tool to test the outcome of his hypothesized course of action, is both a strength and vulnerability of the RPD model. It is simply a brief "wargame" using only the leader's working memory. The strength of mental simulation is in the information gained from forecasting and analyzing the interaction of significant variables of the problems set. Informed by the simulation process, the decision maker can rapidly rule out unsuitable courses of action. Beyond obvious reliance on the decisions makers' expertise, mental simulation has the two additional significant limitations of memory capacity, and uncertainty. Working memory limits the scope of simulation to manipulating approximately three variables and assessing the possible outcomes. The restrictions of working memory introduce potential error because the decision maker may not remain cognizant of the cumulative effects of successively rationalizing apparently irrelevant pattern cues as a means to cope with uncertainty.<sup>17</sup>

Uncertainty is the second significant problem with the RPD process. Pattern cues that do not fit the decision-maker's hypothesis are rationalized as irrelevant. However,

---

evaluating incoming reports. As staff officers filter information they may improperly shape the commanders RPD decisions – they could cause the commander to select the wrong COA because staff officers have inadvertently filtered out critical environmental cues.

<sup>16</sup> Ibid., 57.

<sup>17</sup> Ibid., 52, 204.

rationalization does not imply that the decision maker completely discounts the factors he minimized when forming the hypothesis. These rationalizations induce doubt into the decision process. The magnitude of this uncertainty is dependent upon the decision-maker's level of experience and the magnitude of inconsistency between the hypothesis and the pattern cues. Because uncertainty comes from inconsistent pattern cues rather than a lack of information it cannot be overcome simply by gaining more information. RPD theory states that experts either cope with uncertainty by creating a new hypothesis that is more consistent with the pattern cues or they succumb to intellectual paralysis because their experience does not contain an adequate analogue or metaphor.<sup>18</sup>

RPD adequately describes the method military commanders use to make tactical decisions.<sup>19</sup> Their substantial experience allows them to develop appropriate analogues and employ mental simulation to facilitate their decisions. However, war is a clash of wills between opposing commanders, conducted in an environment fraught with uncertainty that challenges even the most talented and experienced commanders.<sup>20</sup> To complement the commander's RPD based decisions, his staff employs group based analytical decision-making.<sup>21</sup>

---

<sup>18</sup> Ibid., 276-279.

<sup>19</sup> United States Army, *Student Text 6-0 Command and Control*, (Washington, D.C.: Department of the Army, 2000), 4-15. "Depending on the time available or the complexity of the problem, he [the commander] may use the MDMP or intuitive decision making."

<sup>20</sup> Clausewitz, *On War*, 100-112. Clausewitz's concept of friction places great emphasis on uncertainty in war and its effect on decisions and execution of plans. He offers that genius and experience are significant factors that help lubricate the friction of war.

<sup>21</sup> W.A. Schoffner, "Military Decision Making Process: Time for Change", (School of Advanced Military Studies Monograph, US Army Command and General Staff College, 2000), 19, 32. Gary Klein, *Sources of Power*, 240-252.

## **ANALYTICAL DECISION-MAKING**

During the process of collecting and conveying information, military staffs make decisions that shape the commander's RPD decisions. Staff officers filter the information employed in the analytical Military Decision Making Process (MDMP) using their judgment and experience, in effect using RPD to solve minor problems within the larger, more detailed analytical decision process. Analytical reasoning approaches to decision-making seek optimal solutions to complex, often interdisciplinary problems, where a single individual's expertise in a set of the significant facets of the problem may be insufficient to support decision-making based solely on RPD. Analytical decision-making is the basis of the staff actions in the United States Army's MDMP.<sup>22</sup>

One theoretical analytical reasoning approach to group decision-making is a six step process: identify the problem, collect meaningful facts, understand the relevant combine interdisciplinary insights and skills, differences among alternative solutions, implement the decision, and monitor the decision using relevant measures. Analytical decision-making is a linear process that leverages the collective mind of the group to create optimal solutions to problems. It relies on a formal, sequential process to define the problem, its underlying causes and generate potential solutions. Potential solutions are evaluated using either intuitive or statistical modeling, often supported by computer-assisted simulation. After modeling, these potential solutions then compared to one another and evaluated against a set of relevant criteria. Finally, the group establishes metrics to monitor variance during implementation. Given adequate time, analytical

---

<sup>22</sup> United States Army, *FM 101-5* (1997), 5-1.



decision-making can create solutions to problems that mitigate uncertainty and result in an optimal solution.<sup>23</sup>

Analytical decision-making is an effective approach to problem solving, however its disadvantages are that it consumes a great deal of organizational time and energy, it is vulnerable to misperception and miscommunication, and it can produce solutions that are so optimized to the anticipated conditions that they lack sufficient flexibility to apply to changing circumstances. Analytical decision-making is time consuming because it is a sequential process. Creating a shared understanding of the problem, the first step in the process, demands active participation of the entire group. Defining the bounds of the problem requires interaction of the subject matter experts in the group, potentially using a disproportionate amount of time to reach consensus through the group. Generating options, or “brainstorming”, consumes time and energy of the decision-making group. However, time spent generating options can be limited by assumptions and rules generated when defining the problem. The time expended during sophisticated simulation, analysis, and comparison of the options increases as the number of potential courses of action increases.<sup>24</sup>

The second drawback to group-based analytical decision-making is vulnerability to misperception and miscommunication. Group dynamics and expertise differentials among group members increases the risk of error due to misperception and miscommunication. Misperception results from ineffective communication among group

---

<sup>23</sup> Jonathan Keyes, Richard St. Clair and Robert Gray, *Bridging Decisions Into Solutions*, (Kansas City: Woods and Waters Press, 1997), 10-28. There are other models of analytical decision making, however most share these common steps. The model presented by Keyes, et al is consistent with the staff processes contained in the Army’s formal Military Decision Making Process. See United States Army, *FM 101-5* (1997), 5-1.

members. Ineffective communication is caused by distortion of the message by either the sender or the receiver. Principle causes of this distortion are lack of a shared lexicon among group members, inappropriate communication medium, and inattention on the part of the receiver. Misperception is particularly problematic when it occurs during the problem definition phase of analytical decision-making. Miscommunication can be induced by lack of a shared lexicon to describe technical problems or use of allegorical reasoning to explain concepts.<sup>25</sup> Misperception and miscommunication reduce the effectiveness of group-based decision-making and reduce its efficiency because correcting these types of errors delays the decision-making process.

The third, and perhaps most significant, pitfall of group-based analytical decision making is over-optimizing the solution.<sup>26</sup> Restrictive planning assumptions used to simplify analysis can lead groups to create solutions that are so highly optimized against the expected conditions that these solutions lack the necessary flexibility to adapt to unanticipated events. The over-optimization error occurs when efficiency is assessed by measuring the resources applied to the problem, rather than by measuring the outcome of the process. The potential for over-optimization highlights the importance of correctly

---

<sup>24</sup> Paul K. Van Riper and F.G. Hoffman, "Pursuing the Real Revolution in Military Affairs: Exploiting Knowledge Based Warfare", *National Security Studies Quarterly* (Summer 1998), 7-8.

<sup>25</sup> Gary Klein, *Sources of Power*, 249.251. Klein identified the chaotic nature of team planning. Teams cannot control the logical flow of their thoughts or actions because interactions between team members interrupt the logical flow of thought. These interruptions contribute to inattention and wandering focus of individuals and the collective team. A shared lexicon between the sender and receiver is essential to complete understanding; the nuances of colloquial language are a potential source for misunderstanding. The selected communication medium can distort the message when the medium lacks sufficient fidelity to convey the message. For example, using poorly crafted visual aids can distort a message as significantly as noise on a telephone line distorts aural transmission.

<sup>26</sup> Dietrich Döerner, *The Logic of Failure*, (New York: Metropolitan Books, 1996), 27-30, 164.

defining measures of effectiveness and remaining cognizant of the inherent tension between efficient use of resources and effective problem solutions.<sup>27</sup>

### **SYNTHESIS OF DECISION-MAKING THEORY.**

Recognition Primed Decision-Making is the decision method most often used by experienced people working in a time-constrained environment. RPD seeks the first solution that is feasible, suitable, and acceptable by modeling only a few variables. Commanders decide using this intuitive process, however the effectiveness of their decisions is limited by the available analogues in their experience base and the consistency of the available pattern recognition cues. Staff officers also employ RPD to filter information used to support the larger analytical making-making process and monitor execution of planned actions.<sup>28</sup> However, RPD may not be an effective tool where the decision maker lacks adequate experience or the problem's complexity demands an interdisciplinary solution.

Army staffs are designed to provide interdisciplinary expertise to support the commander's decision making and supervise implementation of those decisions. Army staffs use the Military Decision Making Process (MDMP), an analytical decision making process, to generate and test hypotheses because the complexity of military problems demands this approach. Further, the operational level military problems are unique

---

<sup>27</sup> This raises awareness the balance between time, cost, and performance in project development. Efficiency demands that all allocated resources remain employed continuously, however effectiveness may require some resources to become periodically idle to prevent disruption of the overall work flow. These resource management concepts apply equally to arranging military activities.

<sup>28</sup> K.R. Smith, "Using the Same Decision Making Process for Joint and Army Operations", (School of Advanced Military Studies Monograph, US Army Command and General Staff College, 1999), 14-15.

enough to prevent effective use of RPD.<sup>29</sup> The desired outcome of the MDMP is a set of options that will produce tactical and operational success. However, as discussed above, the MDMP is time consuming, vulnerable to errors of misperception and miscommunication among group members, and may result in recommended solutions that lack sufficient flexibility to adapt to unanticipated events.

The scope and scale of analytical decision-making is different from RPD, yet the two processes are complementary and employ similar logic. Analytical decision-making uses multiple hypotheses rather than RPD's single likely hypothesis. Analytical decision-making uses deliberate assumptions to simplify modeling and testing, while RPD based decisions rationalize inconsistent cues. Analytical decision-making involves detailed simulation of complex variables rather than the simple mental simulation of very few variables used in RPD. Analytical decision-making is more comprehensive, and consequently more time consuming, than RPD. Analytical decision-making is an effective process for solving complex problems that are beyond the experience base of a single decision maker and the analytical decision making process can provide valuable inputs to inform the military commander's intuitive decision process. The significant logical difference between RPD and rational analytical decision-making is that RPD

---

<sup>29</sup> Peter Schifferle, in conversation with the author as a School of Advanced Military Studies Student, (Fort Leavenworth, KS: School of Advanced Military Studies, AY 2000-2001). At the time of this writing, Lieutenant Colonel (Retired) Schifferle served as the director of the School of Advanced Military Studies Advanced Operational Art Studies Fellowship. RPD may not support decision-making at the operational level of war because the scope, scale, and inherent complexity of the problem exceed the processing capability of working memory. Lieutenant Colonel Schifferle adds that operational level problems are sufficiently unique that experience gained in one problem is not readily transferred to other problems by analogy or metaphor. Lieutenant Colonel Schifferle's points are quite valid, however they do not negate the tendency of commanders to use RPD-style analogous reasoning in operational problems. For example, the similarities between OPERATION JUST CAUSE, the 1989 US intervention in Panama appears to have been used as an analogous model by XVIII Corps to develop OPLAN 2370, the US intervention in Haiti to remove General Cedras and President Jonnissant from power.

seeks effective solutions through “satisficing” while rational analytical processes seek efficient solutions. RPD emphasizes generating outcomes without regard to process, where analytical processes depend on purposeful execution of the rational process to generate efficient solutions.

## **DECISIONS DETERMINE SYNCHRONIZATION**

RPD and analytical decision-making are complementary processes that both inform, and are informed by, one another. Effectively integrating these decision processes lies at the heart of achieving synchronized operations. To understand the relationship between decision-making and synchronization, we must recall to the definition of synchronization from Joint Publication 1-02: “The arrangement of military actions in time, space, and purpose to produce maximum relative combat power at a decisive place and time.” According to this definition, synchronization cannot occur without nearly continuous decision making during both planning and execution. RPD influences the framing of the problem by providing an appropriate analogue as a point of departure for more comprehensive analytical decision making by the BOS representatives that comprise the commander’s staff. However, the types of decisions made during planning differ substantially from the types of decisions made during execution; both types of decisions determine the overall synchronization of the operation.<sup>30</sup>

The commander facilitates synchronization by decisions he makes to shape the planning process and decisions during execution. These two sets of decisions are inextricably linked because of the commander’s tendency to rely on pattern recognition to

---

<sup>30</sup> United States Army, *ST 6-0* (2000), 6-25.

support his decisions. The commander's planning decisions necessarily shape and constrain the supporting efforts of his staff as they develop courses of action and monitor execution of the plan. During planning, the commander influences synchronization foremost through his intent and design of the operation. Operational design is the single most significant event in synchronizing operations. Once the die is cast, synchronization can only be maintained by decisions to adopt a branch, commit reserves, change the distribution of sustainment, or to adopt a new form of maneuver.<sup>31</sup>

The staff and commander interact to ensure that operations are initially synchronized during the planning process. The analytical work of the staff assists the commander to generate his hypothesis through envisioning and modeling the battlefield environment. The commander, based on his RPD hypothesis, establishes a general line of operations that the staff then uses to create optimized courses of action. Synchronization must be visualized and described early in the decision-making process, it cannot be added as an after-thought. Because synchronization is fundamentally a cognitive process, it depends heavily on the ability to visualize and describe the arrangement of activities in space and time.<sup>32</sup> Visualization, description, and direction of actions are the purpose of the MDMP.

---

<sup>31</sup> Gregory Fontenot, "The Lucky Seventh in the Bulge: A Case Study for the Airland Battle", (School of Advanced Military Studies Monograph, US Army Command and General Staff College, 1985), 10-13. Colonel Fontenot's discussion of the Seventh Division during the Battle of the Bulge highlights that division commanders make very few direct decisions during execution. The decisions available to division commanders center on reinforcing one unit rather than another, shifting or maintaining the line of operations, or maneuvering units to gain positional advantage over the enemy. His monograph also illustrates that uncertainty and friction limit the commander's ability to synchronize his operations in an ad hoc manner; initial dispositions severely limit the options available to the commander.

<sup>32</sup>United States Army, *ST 6-0* (2000), 4-7.

## CHAPTER THREE

# THE MILITARY DECISION MAKING PROCESS

Decision-making is knowing if to decide, then when and what to decide. It includes understanding the consequences of decisions. Decisions are the means by which the commander translates his vision of the end state into action.<sup>33</sup>

*Field Manual 101-5, Staff Organization and Operations*

The Military Decision Making Process (MDMP) established in Army Field Manual 101-5, *Staff Organization and Operations*, is a rational analytical decision-making process. MDMP is intended to create a shared understanding of battlefield conditions between the commander and his staff, assist them in making logical decisions, and to produce a detailed, executable plan to accomplish an assigned purpose. The principle advantages of using the MDMP to solve tactical and operational problems are that MDMP generates a thorough understanding of the various options available to both friendly and enemy commanders, and MDMP results in “the greatest integration, coordination and synchronization for an operation and minimizes the risk of overlooking a critical aspect of the operation.”<sup>34</sup> MDMP is vulnerable to the disadvantages common to all rational analytical processes: misperception, miscommunication, and comparatively time consuming. Discipline within the battle staff is essential to mitigate the effects of misperception, miscommunication, and time consumption. The battle staff leader ensures that doctrinal language is used precisely to describe actions and that orders are expressed

---

<sup>33</sup>United States Army, *FM 101-5* (1997), 5-1.

<sup>34</sup> *Ibid.*, 5-1. *FM 101-5* describes MDMP as a linear process in which the staff and the commander move sequentially through the steps of Receive the Mission, Mission Analysis, COA Development, COA Analysis, COA Comparison, COA Approval, and Orders Production. *FM 101-5* alludes to the iterative nature of MDMP in Note 2 to Figure 5-1, but does not explicitly articulate that each sequential step requires the staff and commander to re-evaluate the results of the previous step.

clearly and concisely. Strict time management is more difficult to assure because of the chaotic nature of the creative process.

*FM 101-5* outlines procedures for MDMP in a time constrained environment.

These doctrinal recommendations rely heavily on the commander's tactical experience to focus staff efforts. Time constrained MDMP illustrates the interaction between recognition primed and analytical decision-making processes to develop executable operations plans.<sup>35</sup> However, the processes described in both time-constrained and unconstrained MDMP briefly mention decision support products, but do not explicitly identify or emphasize these as resultant products of MDMP.<sup>36</sup>

To assess the effectiveness of MDMP in supporting decision-making and synchronization, it is necessary to review the MDMP in some detail. Doctrinally, the MDMP consists of seven steps: receive the mission, mission analysis, course of action development, course of action analysis, course of action comparison, course of action approval, and orders production.<sup>37</sup> These steps roughly parallel the rational analysis process presented by Keyes, et al. Table 1 clearly identifies the lack of emphasis on implementation and decision-making inherent in the MDMP.

---

<sup>35</sup> Ibid., 5-17 to 5-31. *FM 101-5* provides guidance for abbreviating the MDMP to meet time constraints; "omitting steps of the MDMP is not the solution." There are four primary ways to save time in MDMP: increase commander's involvement, more directive commanders guidance, limit the number of COAs developed and analyzed, and maximize parallel planning. All of these recommendations point to reliance on the commander's ability to recognize a pattern and make appropriate decisions based on that pattern recognition. RPD is appropriate for tactical problems in which the commander has the requisite experience. However, time constrained MDMP is problematic for operational level planning, in which commanders and planners may lack adequate experience to curtail deliberate analysis. Operational level planning may be better conducted using the Joint Crisis Action Planning method discussed in *Joint Publication 5.0*. Joint Crisis Action Planning is beyond the scope of this monograph.

<sup>36</sup> Chapter 5 of *FM 101-5* mentions creating a Decision Support Template during COA Analysis, but neither identifies the DST as an output of COA Analysis, nor provides an illustration of the product in the chapter outlining MDMP. Appendix H of *FM 101-5* briefly describes the DST and states that the commander and staff prepare the DST following COA analysis. MDMP doctrine does not place adequate emphasis on the importance of decision support products.



| <b>Pro Forma Analytical Decision-Making Process</b>             | <b>MDMP</b>                          |
|---|--------------------------------------|
| Identify the Problem  | Receipt of Mission, Mission Analysis |
| Collect Meaningful Facts  | Mission Analysis                     |
| Combine Interdisciplinary Insights and Skills                   | Mission Analysis                     |
| Understand the Relevant Differences Among Alternative Solutions | COA Analysis, COA Development        |
| Implement the Decision  | Issue Orders                         |
| Monitor the Decision Using Relevant Measures                    |                                      |

**Table 1- Comparison of MDMP and Pro Forma Analytical Decision-Making Model**

MDMP treats each of the seven steps as discrete, sequential events in which subsequent steps use the results of previous steps to create an executable operations order. The outcomes of all these events influence all of the other events in an iterative manner, therefore errors induced at any point in the process compound if the process is conducted in a purely linear manner. The first step, Receipt of Mission, alerts the commander and staff to prepare for mission analysis. This step may be initiated by higher headquarters directive or internal anticipation of a branch or sequel to ongoing operations. The essential inputs to this step are any existing staff estimates and the authoritative planning directive. The principle outputs are the commander's initial planning guidance and a warning order to subordinate units. *FM 101-5* states that the commander's initial planning guidance should allocate the use of time, focus initial reconnaissance, and authorize required movement.<sup>38</sup> Receipt of Mission relies heavily on the experience of the commander and staff to direct initial reconnaissance and movement of subordinate units.

Warning Order 1, issued after Receipt of Mission, begins the process of synchronizing actions of subordinate units by shaping the perceptions of subordinate commanders, establishing pattern cues that cause subordinate unit actions that necessarily

---

<sup>37</sup> United States Army, *FM 101-5* (1997), 5-3.

constrain the realm of possible future actions. The content and tone of Warning Order 1 shapes the parallel planning and initial disposition of subordinate units. Unfortunately, *FM 101-5* does not clearly describe the relationship between Warning Order 1 and subsequent parallel planning actions during the MDMP, nor does it highlight the importance of identifying the decisive point or set of potential decisive points early in the MDMP. Warning Order 1 should provide subordinate commanders all relevant information to prepare for the pending operation and to conserve the energy of the troops.<sup>39</sup> To focus the parallel planning of subordinate commanders, Warning Order 1 should state the type of operation, the decisive point or set of potential decisive points, articulate tasks that should begin immediately, and allocate the use of available time.<sup>40</sup> To prevent confusion, this first warning order should provide subordinate commanders with insight into the RPD hypothesis underlying the contemplated operation.

## **MISSION ANALYSIS**

The second step in MDMP, and arguably the most important activity, is Mission Analysis. Doctrinally, mission analysis contains 17 discrete sub-events that result in a clear mission statement, an articulation of the commander's intent for the operation, and

---

<sup>38</sup> Ibid., 5-3 to 5-5.

<sup>39</sup> War Department, *Field Service Regulations Operations*, (Washington, D.C.: United States Government Printing Office, 1941; reprint Fort Leavenworth: United States Army Command and General Staff College Press, 1992), 31 (page citations are to the reprint edition). This author feels that the 1941 edition of *Field Service Regulations Operations* describes the content and tone of warning orders better than current doctrine.

<sup>40</sup> United States Army, *FM 101-5* (1997), 5-5. *FM 101-5* prescribes the content of Warning Order 1: type of operation, general location of the operation, time line, initial reconnaissance, and movement instructions. Yet it neglects the conceptual information about the decisive point or action and the general line of operations that are needed to limit the range of actions considered by subordinate units during their parallel planning. To focus efforts of subordinate commanders and create a shared vision, this and all warning orders should communicate conceptual as well as factual information.

commander's guidance for course of action development.<sup>41</sup> Mission analysis depends heavily on staff estimates of friendly and enemy capabilities and limitations. The process of communicating and revising these estimates is essential to developing a shared vision of the battlefield. The staff estimate of enemy intentions, coupled with METT-TC restraints creates the "synthetic experience" and mental model that influences COA development and future analysis.<sup>42</sup> The essential products of mission analysis are an understanding of the potential enemy courses of action developed during intelligence preparation of the battlefield (IPB), an understanding of the time and terrain available, the restated mission, commander's intent and commander's guidance, and Warning Order 2.<sup>43</sup> All of these products influence both synchronization and decision-making during planning and execution.

Intelligence Preparation of the Battlefield (IPB) provides visualization of the effects that the physical environment, terrain, weather, and infrastructure, has on both

---

<sup>41</sup> Ibid., 5-5. The 17 steps in mission analysis are analyze higher headquarters' order, conduct initial intelligence preparation of the battlefield, determine specified, implied, and essential tasks, review available assets, determine constraints, identify critical facts and assumptions, conduct risk assessment, determine initial commanders critical information requirements, determine the initial reconnaissance annex, plan use of available time, write the restated mission, conduct a mission analysis briefing, approve the restated mission, develop the initial commander's intent, issue the commander's guidance, issue a warning order, review facts and assumptions. In practice, these events serve as a checklist for mission analysis products, rather than a rigid sequence of staff actions.

<sup>42</sup> United States Army, *ST 3-0* (2000), 5-3. *ST 3-0* provides METT-TC, mission, enemy, terrain and weather, troops and support available, time available, and civil considerations as the principle factors for battlefield visualization. The United States Marine Corps Warfighting Skills Program offers instead METT-TSL as a visualization construct. These factors, Mission, Enemy, Terrain and Weather, Troops Available, Time Available, Space, and Logistics, are more descriptive of operational level issues than the Army's current METT-TC approach.

<sup>43</sup> Step 17 of mission analysis is quite misunderstood. "During the rest of the decision making process, the commander and staff periodically review all available facts and assumptions. New facts may alter requirements and analysis of the mission. Assumptions may have become facts or may have become invalid. Whenever the facts or assumptions change, the commander and staff must assess the impact of these changes on the plan and make the necessary adjustments." In practice, this step is largely ignored because MDMP is conducted as a linear function in the strictest mathematical sense; the function describes one and only ordinal point for each axial coordinate. The author bases this assertion on his three-year experience as a Joint Readiness Training Center Observer/Controller. Many peer Observer/Controllers

friendly and enemy options. Of the IPB products, the enemy situation template, enemy course of action statements, and modified combined obstacle overlay, are developed to visually portray the most likely effects of enemy and terrain on potential courses of action.<sup>44</sup> These products provide the basic framework for developing friendly courses of action and inform the synchronization process by identifying likely critical capabilities and critical vulnerabilities that bound the set of decisive points.<sup>45</sup>

Commander's intent and commander's guidance provide the focused vision of how the operation will develop in space and time. Commander's Intent provides the key tasks, those things that must be accomplished regardless of the course of action implemented.<sup>46</sup> Commander's guidance is used to limit the number and type of courses of action developed by the staff. Again, doctrine is flawed because at this point the decisive point, the focus of all courses of action, has not yet been articulated by either the commander or the staff. Delaying identification of the decisive point dilutes the

---

share the conclusion that staffs rarely re-assess facts and assumptions.

<sup>44</sup> United States Army Combined Arms Center, *Decision Point Tactics*, (Fort Leavenworth, KS: Center for Army Lessons Learned) [Book on-line]; available from [http://call.army.mil/call/ctc\\_bull/97-4](http://call.army.mil/call/ctc_bull/97-4); Internet; accessed 12 March 2001. Done correctly, IPB provides the friendly unit commander with a set of enemy decision points that can be targeted to limit enemy freedom of action. Targeting enemy decision points is a more logical approach to synchronization than the current technique of identifying enemy most likely and enemy most dangerous courses of action. The most likely and most dangerous COA technique is logically flawed because all FAS friendly COAs must, by definition, address all enemy FAS COAs. To correct this flaw, the intelligence officer portraying the uncooperative enemy must conduct mission analysis and COA development from the enemy perspective and identify the set of potential decision points. Neither *FM 101-5* nor *ST 3-40 Tactics* addresses the importance of enemy decision points as critical vulnerabilities for attack.

<sup>45</sup> Joe Strange, *Centers of Gravity and Critical Vulnerabilities: Building on the Clausewitzian Foundation So That We Can All Speak the Same Language*, (Quantico, VA: Marine Corps University Foundation, 1996), 3. The concept of critical capabilities and critical vulnerabilities was developed by Dr. Joe Strange to assist commanders in analyzing and targeting centers of gravity.

<sup>46</sup> United States Army, *FM 101-5* (1997), 5-9. Doctrinally commander's intent does not describe the method by which the mission will be accomplished nor does it describe the purpose of the immediate operation, but the commander may convey the broader operational context of the mission along with the key tasks.

effectiveness of providing keys tasks to guide planning and complicates efforts to create synergy through synchronizing effects against enemy critical vulnerabilities.<sup>47</sup>

Warning order 2, like all warning orders, is issued to facilitate parallel planning by subordinate commanders. Its content and tone are critical in establishing and maintaining both coordinated action and synchronization of effects. *FM 101-5* states:

Warning Order 2 contains the restated mission, commander's intent, geographical limits of the area of operations, CCIR, risk guidance, initial reconnaissance tasks, security measures, deception guidance, mobility and counter-mobility guidance, specific priorities, the time plan, and guidance on rehearsals.<sup>48</sup>

The restated mission and commander's guidance provide the essential elements of information needed for subordinate units to plan future actions. However, the doctrinal prescription for Warning Order 2 is insufficient to ensure synchronized action for units that rely on mission type orders, also referred to as *Aufstragtaktik*, because it fails to identify the decisive point or points of the planned operation. Lack of a clear set of decisive points or decisive actions leaves a great deal of doubt about how subordinate units should sequence their actions to synchronize effects in time and space.<sup>49</sup> Without a clearly identified set of decisive actions, subordinate units cannot accurately create synthetic experience during parallel planning. These inaccuracies during parallel

---

<sup>47</sup> Ibid., 5-10. *FM 101-5* acknowledges that identifying the decisive point is important, but delays this until course of action development. Mentioning the decisive point during mission analysis, *FM 101-5* states "If, during the estimate process, the commander has identified one or more decisive points, or an action he considers decisive, he should convey this to the staff [in commander's guidance]." To achieve synchronization, the decisive point or decisive action must emerge from mission analysis.

<sup>48</sup> Ibid., 5-10 to 5-11.

<sup>49</sup> Gary Klein, *Sources of Power*, 225-229. Klein states that the doctrinal prescription for commander's intent is inadequate because it does not communicate the message in a meaningful way. He proposes that commanders describe their intent through a story using the following construct: "Here's what I think we face. Here's what I think we should do. Here's why. Here's what we should keep our eye on. Now talk to me." This approach maintains focus on the main points of the problem and prevents subordinates from being confused by minutia.

planning can induce incorrect rules for subordinate behavior that result in undesirable tactical actions of the overall organization.<sup>50</sup>

Mission analysis is the most important task in the Military Decision Making Process. Mission analysis defines the military problem in a mission statement, identifies likely routes to solutions through commander's guidance and intent, and communicates relevant information to support subordinate unit parallel planning through warning orders. The genuine value added by mission analysis is developing a shared understanding of the task at hand and the environment in which actions must occur. Mission analysis generates the underlying hypothesis supporting COA development.

#### **COURSE OF ACTION DEVELOPMENT.**

From the situational understanding developed during mission analysis, the next action in the MDMP is to create viable options to solve the military problem in a manner consistent with the commander's intent.<sup>51</sup> The courses of action (COA) must all meet screening criteria of feasibility, suitability, acceptability, distinguishability, and completeness.<sup>52</sup> Doctrinally, decisive points are identified during COA Development.<sup>53</sup>

---

<sup>50</sup> Complexity theory governs both macro and micro level responses of combat organizations. Failure to communicate the decisive point or decisive action early in the parallel planning process limits the ability of subordinate units to assess windows of vulnerability and sequence actions appropriately. This effect is particularly acute in large organizations, such as corps directing the actions of divisions, because the planning horizons are short relative to the initiation of action. The impact of non-linearity and complexity will be presented in greater detail later in this monograph.

<sup>51</sup> United States Army, *FM 101-5* (1997), 5-13. *FM 101-5* identifies six steps to develop COAs: analyze relative combat power, generate options, array initial forces, develop the scheme of maneuver, assign headquarters, and prepare COA statements and sketches.

<sup>52</sup> Ibid., 5-11. Screening for feasibility, acceptability, suitability, and distinguishability is informed by the understanding generated during mission analysis. These screening criteria are highly subjective. Their employment depends on the staff's mastery of the science of war to evaluate potential options and eliminate those that are inappropriate

<sup>53</sup> Ibid., 5-12. Doctrinally, the decisive point is determined when generating options for COAs. This author believes this approach to be incorrect. To minimize further mission analysis during COA development, the staff should identify potential centers of gravity and decisive points during mission analysis. It is logically

The staff then engages in brainstorming to generate options. These options, schemes of maneuver, are described using COA statements, narrative summaries of the concept of operations, and COA sketches, pictorial representations of the militarily significant terrain and array of forces.

The COA statements and sketches are essential to creating and communicating an understanding of the synchronization of effects in the operation. The COA sketch spatially displays the force array against militarily significant terrain in a series of snapshots, which depict anticipated action and reaction between the opposing forces. To effectively synchronize actions against the decisive point the COA sketch should visually portray both the decisive point and the decision points that signal where adjustments may be required during execution.<sup>54</sup> Actions depicted on the COA sketch are recorded in the COA statement.

The COA statement is a brief narrative summary of the concept of the operations. It is the vehicle for establishing the conceptual synchronization of purposes because it captures the relationship of actions in time and space relative to the enemy decisive point. The COA statement should also include a brief discussion of the purposes of the identified decision points and their relevance to synchronized effects at the decisive point. The example COA statement provided in *Field Manual 101-5* provides an excellent framework for describing the coordinated action necessary to synchronize effects. However, it neglects any discussion of branch plans that inevitably emerge. It

---

inconsistent to develop a mission and intent without clear articulation of the decisive point.

<sup>54</sup> Ibid., 5-13 to 5-14. The COA sketch depicts friendly unit actions using standardized graphic symbols. *FM 101-5* describes decision points to include on the COA sketch as “maneuver options that may develop during and operation.” This language obscures the importance of representing decision points during COA development.

also fails to articulate the decisive point or decisive action that achieves the larger purpose of the operation. These two deficiencies inhibit effective synchronization during execution.

Mission Analysis establishes the framework for synchronization during COA development by presenting relevant facts and assumptions in a way that allows the commander and his staff to visualize the physical environment of the battlefield and the likely events that will occur in that environment.<sup>55</sup> Mission Analysis generates the synthetic experience that leads to COA development. This synthetic experience allows commanders and staff planners to begin filtering out unacceptable COAs using RPD intuitive analysis. As the COAs are developed, planners use mental simulation to visualize the overall flow of actions, creating an analogy with which to describe their mental simulation. The results of the mental simulation that generates a course of action are documented in the COA statement and Sketch. To ensure synchronization, the COA statement and sketch must portray both the decisive points and the decision points that adjust the lines of operation so that effects remain focused against the decisive point.<sup>56</sup> These decision points allow the commander to maintain synchronization in much the same manner as a TOW gunner makes adjustments to the path of his missile until the target is destroyed. Failure to identify decision points result in an incomplete COA; a shot in the dark analogous to a TOW missile fired but not tracked.

Effective COA development is an iterative process of conceptualization, additional mission analysis, and informal course of action analysis. Additional mission

---

<sup>55</sup> Ibid., 5-10.

<sup>56</sup> W.A. Schoffner, "Military Decision Making Process: Time for Change", 10, 38-39.



analysis is required to verify whether or not rationalized pattern cues remain irrelevant and to amplify the visualization of the problem. Additional Mission Analysis during COA Development is necessary for complete understanding of the problem and to anticipate consequences of the COA.<sup>57</sup> COA development includes informal COA Analysis using mental simulation to determine if the COAs meet the criteria of feasibility, suitability, acceptability, and distinguishability. Mental simulation during COA Development, accentuating the iterative character of MDMP, results in refinements to the COAs being considered. This informal COA analysis is productive because it prevents the staff from wasting time developing COAs that will not solve the military problem.

At the end of COA development, augmented by the supplementary mission analysis and informal COA analysis, the staff has generated viable COAs that will all produce the desired results in a manner consistent with the commander's intent. Ideally, synchronization is assured by nesting purposes of subordinate unit actions and visually portraying actions and decisions on the COA sketch. The COA statement, COA sketch, and nesting diagram can then be translated into decision support products that facilitate synchronization during execution.<sup>58</sup>

Theoretically, at this point the commander can choose a COA and the staff can rapidly translate it into an executable order without further detailed analysis.<sup>59</sup> Foregoing

---

<sup>57</sup> Gary Klein, *Sources of Power*, 250-257.

<sup>58</sup> Department of the Army, *FM 101-5* (1997), H-8 to H-10. The synchronization matrix is doctrinally linked to the DST, however the synchronization matrix does not typically include the relevant information to support decision-making. The Decision Support Matrix is a non-doctrinal term referring to a modified wargame worksheet linked to the DST.

<sup>59</sup> Gary Klein, *Sources of Power*, 103. Klein calls this point the "zone of indifference", where all COAs will sufficiently solve the problem. See also War Department, *Field Service Regulations Operations* (1941), 25. The 1941 predecessor to *Field Manual 100-5 Operations* acknowledges the zone of

detailed COA analysis poses moderate risk if subordinate units lack the ability to execute mission type orders. However, well-trained units can execute synchronized operations without detailed scripting that occurs during COA Analysis.<sup>60</sup>

## **COURSE OF ACTION ANALYSIS**

COA analysis, referred to as war gaming, is detailed simulation of the events visualized during COA development. Doctrinally, it is intended to generate “as near an identical vision of the battle as possible...identify the coordination requirements to produce synchronized results, and determine the most flexible course of action.”<sup>61</sup>

Critical inputs from previous MDMP events are enemy event templates, COA sketches and statements, and adequate map coverage for the area of operations.<sup>62</sup>

In preparation for COA Analysis, planners use critical events and decision points derived from the COA statements, though additional decision points and event triggers may emerge during the wargame. Evaluation criteria, deduced from the mission statement or commanders intent, are identified during COA Analysis. To be meaningful,

---

indifference “On the basis of this analysis, he [the commander] the considers the relative advantages and disadvantages of his on lines of action, and selects that line of action which most promises success regardless of hat the enemy may do. *If two or more lines of action appear equally promising, he chooses the one which will most favor future action.*”

<sup>60</sup> This author believes that detailed COA analysis is included in the MDMP as a method to present a detailed script of friendly actions to tightly control the actions of subordinate units and that this scripting increases the consequences of uncertainty by centralizing decision-making at increasingly higher levels.

<sup>61</sup> Unites States Army, *FM 101-5* (1997), 5-16 to 5-17. Wargaming consists of eight steps: gather the tools, list all friendly forces, list assumptions, list known critical events and decision points, determine evaluation criteria, select the wargame method, select a method to record and display results, wargame the battle and assess the results. As previously noted, evaluation criteria or measures of merit are better generated during COA development, where the planner maintains a more macro view of the problem. Evaluation criteria should emerge from consideration of the mission and commanders intent. Equally important, considering metrics during COA development necessarily leads to COAs that are more clearly focused on accomplishing those measures.

<sup>62</sup> *Ibid.*, 5-16.

these criteria must be articulated and defined before the wargame begins, and defined in terms of effects on the enemy and posturing the friendly force for future operations.<sup>63</sup>

Effective wargaming simulates action, reaction, and counter-action by opposing units at critical events. The purpose of this simulation is to ensure that the effects of all the battlefield functions have been considered during planning. In practice, it is a means of ensuring coordination of friendly action rather than ensuring synchronization of effects against the enemy decisive point. *FM 101-5* outlines three methods of wargaming: belt, box, and avenue in depth. All of these techniques attempt to analyze action in space and time. However, the method of recording the wargame can sacrifice synchronization of effects to coordinated action and drives the staff toward over-optimizing a friendly course of action against discrete enemy actions.<sup>64</sup>

The two doctrinal methods of recording wargame results are the synchronization matrix and the wargame worksheet. The synchronization matrix, inappropriately named because it coordinates battlefield functions rather than synchronizing effects, is a two-dimensional worksheet on which enemy and friendly actions are recorded in chronological sequence.<sup>65</sup> Used in conjunction with the COA sketch or map overlay, the synchronization matrix illustrates action in space and time. It is a useful tool for identifying tasks of subordinate units, but can become a script by which units rigidly conduct operations. Used as a script, the synchronization matrix detracts from decision-

---

<sup>63</sup> In practice, evaluation criteria are often an afterthought and have little bearing on COA Analysis. Planners intuitively recommend as preferred course of action and develop criteria that justify the intuitive decision.

<sup>64</sup> United States Army, *FM 101-5* (1997), 5-18 to 5-19. *FM 101-5* identifies the methods of wargaming. This author's assertion that wargaming tends to become clouded in minutia is based on serving three years as an Observer/Controller at the Joint Readiness Training Center.

<sup>65</sup> This author intends battlefield functions to include both the seven BOS identified in *Field Manual 101-5* and joint fires and maneuver support provided by other services.

making and inhibits effective synchronization.<sup>66</sup> *FM 101-5* acknowledges the potential misuse of the synchronization matrix and recommends against distributing the synchronization matrix to subordinate units.<sup>67</sup>

The second method of recording results of COA analysis is the wargame worksheet. The wargame worksheet is also a two dimensional matrix, however it emphasizes event based decision making rather than detailed temporal coordination of friendly actions. The wargame worksheet records enemy and friendly actions, but adds decision criteria and control measures that influence synchronization more effectively than the synchronization matrix. The wargame worksheet used with the decision support template is a more effective way to focus attention on synchronization. However, creating the operations order from a wargame worksheet is more difficult than with the synchronization matrix because the wargame worksheet relied more heavily on the descriptive concept of the operation created during COA development.<sup>68</sup>

MDMP describes COA analysis as a discrete step required to ensure that all significant factors have been considered in COA development, to ensure that actions are synchronized, and to select the most desirable solution to the military problem. This author believes that there are three fundamental flaws associated with discrete COA analysis. First, synchronization must be built into the course of action during COA development, it cannot be added as an afterthought during COA analysis. Second, detailed wargaming tends to mire the staff in minutia, inhibiting overall synchronization

---

<sup>66</sup> W.A. Schoffner, "Military Decision Making: Time for Change", 10-13.

<sup>67</sup> United States Army, *FM 101-5* (1997), 5-19, H-10.

<sup>68</sup> Based on three years experience as a Joint Readiness Training Center Observer/Controller and discussions with other Observer/Controllers, this author asserts that the synchronization matrix dominates the practice of MDMP because it is easier to use in developing the operations order because it identifies

because the staff loses its holistic perspective on the problem. Finally, while the detailed simulation conducted during COA analysis is useful, it is not necessary for units with experienced commanders and well-trained staffs. Practicing COA analysis as part of an iterative cycle with mission analysis and COA development is more effective and more appropriately emphasizes synchronization over coordinated action.

The remainder of MDMP, COA comparison, COA approval, and order production are relatively mechanistic processes that have little impact on synchronization. As previously noted, elements of COA comparison and approval, along with mission analysis, occur during COA development. The relative intensity of COA comparison and approval conducted during COA development and COA analysis varies directly with the level of commander involvement and inversely with the amount of time available.<sup>69</sup>

### **SUMMARY OF MDMP.**

The MDMP is constructed as a rational analytical process to create viable solutions to military problems. It is described and practiced as a sequential, linear process to both inform decision makers and produce executable plans and orders. The sequential nature of MDMP inhibits holistic thinking about the tactical problems and

---

tasks by major subordinate headquarters more clearly than does the wargame worksheet. However, the wargame worksheet captures decision criteria more concisely than does the synchronization matrix.

<sup>69</sup> United States Army, *FM 101-5* (1997), 5-23. *FM 101-5*, page 5-23 provides a checklist of 30 potential results of wargaming. Taken collectively, these elements describe the relationships among battlefield operating systems and their contribution to action at the decisive point. This checklist is equally useful as a guide during mission analysis; these considerations should be addressed earlier in the MDMP.

tends to drive the staff toward excessively optimized, scripted courses of action that centralize decision-making, and the uncertainty that attends those decisions.<sup>70</sup>

The sequential manner in which MDMP is practiced diminishes focus on holistic synchronization of effects because the products of MDMP do not reflect a holistic approach. For division level and larger organizations seeking to employ *Aufstragtaktik*, detailed course of action analysis can lead to intricate, unproductive scripting in which the effects of uncertainty and complexity are subordinated to concentration in space and time. MDMP should doctrinally be described as an iterative process that emphasizes the manner in which mission analysis, COA development, and COA analysis both inform and are informed by one another. Doctrinally, the principle outcome of the MDMP is an executable order that describes and directs the action of subordinate units. An equally important function of the products of MDMP is supporting the necessary adjustment decisions required during execution. MDMP insufficiently emphasizes the decision support template and the decision support matrix that allow effective synchronization. Throughout the MDMP it is essential to keep an eye toward the Clausewitzian dictum that war is a contest of wills, therefore synchronization is a dynamic process that functions through decision-making. The remaining chapters will amplify the impacts of complexity, uncertainty, and concentration on synchronization and assess the effectiveness of MDMP products in addressing these variables.

---

<sup>70</sup> John F. Schmitt and Gary A. Klein, "Fighting in the Fog: Dealing with Battlefield Uncertainty", *Marine Corps Gazette*, 66-69. W.A. Schoffner, "Military Decision Making: Time for Change", 19.

## CHAPTER FOUR

### FACTORS INFLUENCING SYNCHRONIZATION

The two factors of complexity and uncertainty affect the types of decisions required to maintain synchronized effects at the decisive point. Complexity and uncertainty both influence the effectiveness of the decision-maker and the types of information needed to support his decisions. This chapter explains the impact of complexity and uncertainty on decision-making and assesses the effectiveness of MDMP in accommodating the effects of complexity and uncertainty.

#### COMPLEXITY

To this point, it has been argued that synchronization, the arrangement of military actions in time, space, and purpose to produce maximum relative combat power at the decisive place and time, results from decisions made by the commander and his staff during both planning and execution. A cursory assessment of military action could lead one to the conclusion that synchronization is nothing more than scripting activities in a particular sequence and triggering the execution of that sequence based upon environmental cues. Simple scripting of one's own actions against the most likely actions of the opponent can be successful only if the opponent has decidedly inferior combat capability; if decisive overmatch exists.<sup>71</sup> Because such dramatic overmatch is

---

<sup>71</sup> The concept of "decisive overmatch" presented in this monograph reflects concepts discussed with Major Michael Johnson during SAMS seminar. Symmetric warfare among similarly armed opponents develops into a contest of exhaustion. To avoid the economic and political costs of exhaustion, the weaker opponent will alter his strategy, and consequently his battlefield behavior, to leverage some asymmetry. Unless the outcome is decisively concluded at an early stage, the nature of the conflict will evolve to remain consistent with the aims of the combatants. Clausewitz presents this concept as Polarity in Book 1 of *On War*. Clausewitz, *On War*, 79-83. *ST 3-0* discusses overmatch in terms of both superior physical mass and tempo generated by superior agility that provides advantage. United States Army, *ST 3-0*, 6-15.

rarely manifested, it is necessary to examine the relationship between synchronization and complexity. This chapter employs complexity theory to establish a link between unit performance, the Military Decision-Making Process, and synchronization.

Complexity theory, initially developed to explain the behavior of non-linear systems common in natural science, is becoming a popular tool to describe the behavior of war. Kevin Kelly, author of *Out of Control: The New Biology of Machines, Social Systems and the Economic World*, presents the beehive as a useful analogy to explain complexity theory. In the colony, individual bees behave according to their roles, worker, drone, queen, and brood, without apparent communication with other bees performing other roles. Yet, the collective hive functions effectively, and far differently than linear aggregation of individual behavior would point toward. Kelly's "hive mind" and "swarm systems" exist because of a distributed consciousness that results from four factors: absence of centralized control, autonomous individual actors that behave according to internal rules rather than central control, high connectivity between individual actors, and non-linear causality of peers influencing peers.<sup>72</sup> Kelly's description of swarm behavior and the hive mind parallels the pattern of distributed operations presented in Army operations doctrine.<sup>73</sup>

---

<sup>72</sup> Kevin Kelly, *Out of Control: The New Biology of Machines, Social Systems and the Economic World*, (New York: Addison-Wesley Publishing Company, 1994), 10-13, 19-22. Kelly offers five benefits of "swarm systems" that exhibit hive behavior: adaptable, evolvable, resilient, boundless, and novelty. These characteristics allow swarm systems to create macro-level collective order from lower level disorder and ensure system durability during environmental instability. These are desirable characteristics of military units operating under mission-type orders, synchronized by intent rather than scripted events. Kelly also identifies three militarily significant drawbacks to swarm systems: non-optimal, non-controllable, and non-predictability. Duplication of effort and lack of causal predictability is militarily undesirable, however, this observation reinforces the Clausewitzian notion of fog and friction that governs the environment of combat.

<sup>73</sup> Gregory Fontenot, "The Lucky Seventh in the Bulge: A Case Study for the Airland Battle", 130-133, 185-187. Fontenot argues that distributed operations are to be expected and that synchronization is achieved by enhancing flexibility through task organization and concept of operation. Synchronization is maintained by recognizing when adjustments must be made to the existing plan. John Arquilla and David



Complexity theory accurately describes war at both the macro and micro levels. Barry Watts, co-author of the *Gulf War Air Power Study*, employs complexity theory to explain the ubiquitous fog and friction of battle at the micro level. First, individual actors modify their rules-based behavior in response to battlefield feedback. This independent, iterative behavior modification makes linear analysis highly inaccurate. Further, human sensitivity to battlefield events makes combat structurally unpredictable, increasing the influence of chance and uncertainty on both the micro and macro complex systems engaged in conflict. Watts concludes that war is indeed a complex system in which the actors respond to events in unpredictable ways.<sup>74</sup> Complexity theory informs the quest for synchronization because it emphasizes three key factors: that aggregation of small unit behavior may result in unexpected emergent macro-level responses, that the most adaptive organizations exist on the edge between chaos and order, and that “satisficing” is the operative strategy of complex systems.<sup>75</sup> Given that war is a complex system and that synchronization is a product of decision-making, how does the MDMP accommodate the complexity of warfare to maintain synchronization?

---

Ronfeldt, *Swarming and the Future of Conflict*, (Santa Monica: RAND, 2000), 17-22. This RAND study identifies the benefits and risks associated with decentralized maneuver warfare visualized by the current Army Transformation initiative. Important to effective distributed operations is effective information networking that enables decentralized decision-making consistent with the overall concept of operations. It cautions that excessive decentralization induces risk of disorganization and defeat.

<sup>74</sup> Barry D. Watts. *Clausewitzian Friction and Future War*, (Washington, DC: National Defense University Press, 1996), 105-107, 118-120. Watts’ work was developed in response to arguments offered by William Owens that technological achievements can eventually eliminate the fog of war and simplify the execution of combat operations. Watts’ general theory of friction consists of four propositions and evolves directly from Clausewitz’s paradoxical trinity. War is a clash of wills; outcomes of war are highly contingent, with the second order effects remaining hidden for long periods of time; differential friction is more significant than absolute levels of friction; and finally, friction may make the difference between success and failure. Watts’ general theory of friction illuminates the concept of synchronization because it directly influences the actors’ ability to obtain a relative combat power advantage at the decisive place and time. For an alternative view, see William Owens’ *Lifting the Fog of War*.

<sup>75</sup> David K. Gerber, *Adaptive Command and Control of Theater Airpower*, (Maxwell AFB: Air University Press, 1999), 20-25.

First, doctrine acknowledges complexity by encouraging subordinate initiative through mission type orders.<sup>76</sup> To support mission type orders, the MDMP must generate options that are sufficiently flexible that they allow individual actors (subordinate unit commanders) to adapt their rules-based behaviors (tactics, techniques, and procedures) without catastrophically disrupting the macro behavior of the larger organization. Complexity theory indicates that synchronization is not the scripting of sequential actions of one antagonist; rather it is the feedback-induced, continuous adjustment by individual actors.<sup>77</sup> Plainly, MDMP must generate flexible operational concepts that provide broad latitude to subordinate units, yet focus efforts on the selected decisive point.

The MDMP influences the “rules” informing subordinate behavior in several ways. First, the warning orders issued throughout the MDMP contribute to the mental model used in subordinate planning. Once established, this mental model is difficult to break. If this mindset is incorrect, it will become very difficult to maintain synchronization. As previously stated, the principle fault MDMP induces into synchronization is the late identification of the decisive point – the center of synchronized operations. Key tasks and intent articulated in Warning Order 2 further exacerbate synchronization problems because these do not describe the relationship between action and purpose at the decisive point. Parallel planning absent a clearly articulated decisive point or decisive action can produce unsynchronized action because

---

<sup>76</sup> United States Army, *ST 3-0* (2000), 4-5.

<sup>77</sup> David K. Gerber, *Adaptive Command and Control of Theater Airpower*, 22. Gerber points to LTC Boyd’s “OODA loop” as an example of micro level complexity and concludes that too many rules slow adaptation and ultimately inhibit individual performance, which may ultimately produce a military defeat.

the implicit behavior rules of subordinate commanders are not focused on the correct decisive action.<sup>78</sup>

Beyond the problems complexity induces into parallel planning, excessive scripting that can occur during COA analysis can disrupt synchronization. The synchronization matrix coordinates friendly actions relative to one another but is not structured to link these actions to the decisive point in space and time. Complexity theory explains how micro-level behavior of subordinate units adjusts to environmental feedback from interaction with the opposing force, and how these micro-level behaviors can lead to an unpredictable macro-level response – unsynchronized effects. Small units react to local conditions and adjust their actions accordingly. In doing so, the tempo of the overall operation is necessarily changed, which may result in both uncoordinated and unsynchronized actions.<sup>79</sup> To better accommodate complexity, division and larger organization should focus efforts on developing robust, flexible operational concepts that synchronize effects on a decisive point and develop metrics to keep actions focused on that decisive point.<sup>80</sup> To accomplish this, the MDMP should emphasize the iterative relationship between mission analysis, COA development, and COA analysis. Further, large organizations should limit COA analysis to only those factors that ensure feasible, acceptable, and suitable COAs.

---

<sup>78</sup> United States Army, *ST 3-0* (2000), 4-22 to 4-24. *ST 3-0* offers an alternative construct that describes the battlefield framework in purpose terms. Decisive, Shaping, and Sustaining (DSS) operations replace the spatially oriented Deep, Close, Rear battlefield framework found in *FM 100-5 Operations*. The proposed DSS framework may improve synchronization during parallel planning because it conceptually emphasized the relationship between action and purpose.

<sup>79</sup> This effect dramatically appears when units script action so tightly that unexpected tactical success results in logistical culmination before the decision action can be taken.

<sup>80</sup> John F. Schmidt and Gary A. Klein, "Fighting in the Fog: Dealing with Battlefield Uncertainty", 66. In addition to filling voids in essential information, Commander's Critical Information Requirements (CCIR) establishes parameters for measuring system performance.

The content and tone of warning orders should focus subordinate unit efforts on the decisive action and emphasize coordinated action relative to purpose, rather than space and time.<sup>81</sup> Critical products of the MDMP to accommodate complexity theory are IPB templates, an intent statement that identifies the decisive point, a flexible concept of operations that links actions and purpose, a decision support matrix, and a decision support template. These products, developed with an eye toward synchronization and RPD mitigate the potential negative effects of battlefield complexity.

The products of the MDMP do not effectively accommodate the effects of complexity because decision-making is not adequately emphasized. However existing products can be easily modified to strengthen the linkage between decision-making and synchronization. These decision-support products generated by the MDMP must visually display these decision points relative to the enemy decisive point in purpose, space, and time. Along with the decision point's visual cue, the decision support products must present the parameters that indicate whether or not a decision is required. Finally, the decision support products must be consistent with recognition-primed decision-making that occurs in high stress environments.

## UNCERTAINTY

Uncertainty is an integral part of war at all levels. Clausewitz's concept of *coup d'oeil*, that inner light of truth and the strength to follow it, reveals the difficulty commanders have determining the relevant facts and making decisions to act on those

---

<sup>81</sup> Timothy D. Lynch, "Operational Synchronization: A Revised Doctrinal Perspective", (School of Advanced Military Studies Monograph, US Army Command and General Staff College, 1990), 6.

facts.<sup>82</sup> Because uncertainty affects decision-making, it is potentially disruptive to efforts to synchronize operations.

Uncertainty is one of the principle components of friction that make synchronization difficult.<sup>83</sup> Uncertainty makes coordinated action, the underlying premise of synchronization, difficult because it triggers hesitation in leaders, leading to reduced tempo and increased dispersion of forces. Uncertainty about the location and timing of the decisive point compounds the difficulty of synchronizing effects. The distinction between coordinating internal action to facilitate action and synchronizing effects at the decisive point is not trivial. Again, coordinated action is necessary but not sufficient to achieve synchronization. Uncertainty about the disposition and status of friendly units is operationally less significant to synchronization than uncertainty about the location and timing of the decisive point because it is relatively easier to mitigate uncertainty about internally coordinated action through the use of reserves and redundant capability than it resolve uncertainty about the location and timing of the decisive point. For example, a division defending against an attack can mitigate uncertainty about combat power of subordinate units by increasing reserve units and restrictive maneuver control measures. However, uncertainty about the location and timing of the enemy main attack is difficult to eliminate. There risk of failure associated with misidentifying the location and timing of the enemy decisive point is higher because the friendly commander cannot rapidly restructure his entire defense to engage a drastically different decisive point. If, however, the friendly commander has accurately determined the

---

<sup>82</sup> Clausewitz, *On War*, 102.

<sup>83</sup> Paul K. Van Riper and F.G. Hoffman, "Pursuing the Real Revolution in Military Affairs: Exploiting Knowledge Based Warfare", 2-4.

location and timing of the decisive point, he can then make minor adjustments to his defensive plan to defeat the enemy force.

There are four major causes of battlefield uncertainty that affect decision-making: missing information, unreliable information, ambiguous and conflicting information, and complex information.<sup>84</sup> Missing information has less of an impact on synchronization and decision-making than the remaining categories because assumptions substitute for missing information until that information becomes available. Substituting assumptions for missing information, or in RPD terminology rationalizing decision cues, is a straightforward process that minimally disrupts the decision making process. Clear articulation of these assumptions to subordinate units through commander's critical information requirements (CCIR), coupled with flexible plans that decentralize decision-making facilitate internally coordinated action that is necessary for synchronized effects.<sup>85</sup>

The remaining causes of uncertainty, unreliable information, ambiguous and conflicting information, and complex information, pose potential problems for synchronization because they disrupt both rational and recognition-primed decision processed.<sup>86</sup> Staffs and commanders find it difficult to reconcile these conflicting cues using assumptions and information management techniques. All of these factors

---

<sup>84</sup> John F. Schmitt and Gary A. Klein, "Fighting in the Fog: Dealing with Battlefield Uncertainty", 63.

<sup>85</sup> Ibid., 67. Commanders Critical Information Requirements (CCIR) provide a method to communicate understanding of key assumptions and missing information throughout the organization. CCIR focus collection efforts on key information needed to confirm or deny the validity of assumptions and provide essential missing information to support decision-making. CCIR also serve to control perception and response of subordinate units, and reduce the negative effects of emergent reactions inherent in micro-level complex systems. Using CCIR in this manner demand well crafted CCIR and a C4ISR system that facilitates rapid communication to all levels of the organization. Without effective C4ISR procedures, decision-making tends toward centralization, necessarily reducing operational tempo.

<sup>86</sup> Gary Klein, *Sources of Power*, 278.

contribute to the fog that surrounds war, making leaders hesitant to decide which action is appropriate in a given set of conditions.<sup>87</sup> Most importantly, unreliable, conflicting, ambiguous, and complex information mask the location and timing of the decisive point.

Uncertainty complicates effective decision-making. Both rational analysis and RPD reduce the effects of uncertainty through assumptions to simplify the problem. As uncertainty increases, military organizations increase centralization of decision-making to reduce the effects of error. Centralized control of asset employment can provide synchronization if and only if tactical execution is responsive and flexible.<sup>88</sup> MDMP doctrine adequately addresses the impacts of uncertainty on synchronization.

These four causes of uncertainty impact MDMP during Mission Analysis, COA Development, and COA analysis. Assumptions and Commander's Critical Information Requirements (CCIR) are employed to reduce the effects of uncertainty during planning. Properly done, adjustment decisions initiating branches or sequels to the current plan allow the commander to respond to minor shifts in the location and timing of the decisive point and to the status of his subordinate units. The rational analysis of MDMP serves to inform the commander's intuitive decision-making process by clarifying his expectations of likely outcomes. The significant problem uncertainty poses to MDMP is the previously noted tendency to excessively optimize a course of action for a single set of

---

<sup>87</sup> John F. Schmitt and Gary A. Klein, "Fighting in the Fog: Dealing with Battlefield Uncertainty", 66.

<sup>88</sup> David K. Gerber, *Adaptive Command and Control of Theater Airpower*, 1, 97-98. Major Gerber argues that centralized decision-making is essential to synchronization, however centralization is effective if and only if the C2 structure and training level of the organization permit rapid, flexible response to changes in the tactical environment. The science of time-space relationships establishes the balance between centralized decision-making and decentralized execution for any level of technology. The communication technology bounds the OODA loop, requiring organizations to decentralize decision-making to disperse the effects of uncertainty and incrementally increase the overall effectiveness of coordinated action. Operations orders and plans must account for these physical limitations through flexibility and focus on decisive action.

conditions. This potential fault is mitigated by artful development of decision points and creation of effective criteria supporting those decisions. The MDMP products that mitigate uncertainty in both planning and execution are the DSM and DST. However, these products are not given appropriate emphasis in the MDMP doctrine outlined in *FM 101-5*.<sup>89</sup>

Carefully crafted CCIR, appropriately emphasized in MDMP, are essential to reducing uncertainty from missing information, ambiguous, and conflicting information. CCIR contribute to a focused reconnaissance and surveillance plan, which reduces missing essential information. Focused CCIR, identifying only key elements of information to support synchronization decisions, reduces the overall amount of information collected and processed by the C4ISR system. Reduced information flow diminishes the potential for conflicting and ambiguous information, which reduces the most disturbing sources of uncertainty.

The remaining significant way of reducing the effect of uncertainty, distributing uncertainty throughout the organization, cannot easily be codified in an analytical decision process because it falls within the art, rather than the science, of war.

*Aufstragtaktik*, decentralized operations based on mission type orders, reduces the effects of uncertainty throughout the organization because of the broad freedom of action each echelon is given to accomplish its task. Nevertheless, *Aufstragtaktik* may sacrifice synchronization of effects because the attendant chaos of complex systems dilutes the effects of highly distributed operations. Commanders must carefully balance the potential for decentralization to inhibit synchronization by carefully crafting robust,

---

<sup>89</sup> United States Army, *FM 101-5* (1997), H-7 to H-9.



flexible operational concepts and instituting appropriate CCIR to serve as feedback mechanisms for higher level synchronization.

MDMP doctrine, coupled with intuitive decision processes, effectively addresses tactical and operational uncertainty. To ensure that uncertainty does not inhibit synchronization, commanders and staff officers must diligently attend to the art of tactical employment and remain cognizant of subordinate unit decision processes while planning future operations.<sup>90</sup>

## CHAPTER FIVE

### RECOMMENDATIONS

Synchronization, the arrangement of activities in time, space, and purpose to achieve decisive advantage at the decisive point, is a critical factor in gaining and maintaining the initiative during conflict. Synchronization is more than elegantly scripted coordinated action, it is a dynamic process predicated upon continuous decision-making. Generating synchronization is not a mechanistic procedure – it is conceptual art. No single product can generate and maintain synchronization. However, shifting the focus of the planning process to adjustment decisions improves overall synchronization and effectiveness. Current MDMP doctrine does not emphasize synchronization because it is structured to focus on creating an operations order rather than the decisions required to maintain synchronization during execution.

The products of the MDMP do facilitate massing combat power at the decisive place and time. However, MDMP does not adequately support massing combat power

for the decisive purpose, nor does it effectively communicate the commander's vision to subordinate units. The shortfalls in MDMP are caused by the linear, sequential structure of the analytical process. To improve synchronization and the effectiveness of parallel planning, the MDMP must be conceived and practiced as a cyclical, iterative process that centers on the decisive point or decisive action. Mission analysis, the most important action in MDMP, generates the underlying hypothesis and the synthetic experience to support recognition-primed decisions during both planning and execution. The warning orders and intelligence preparation of the battlefield products generated during mission analysis shape subordinate unit planning. To achieve synchronization, MDMP must identify the decisive point or decisive action during mission analysis. Course of action comparison criteria should emerge during mission analysis and be articulated through commander's planning guidance and commander's intent. Identifying decisive points and COA criteria during mission analysis allows the staff and subordinate commanders to retain a holistic view of the problem and generate feasible, suitable, and acceptable (FAS) solutions that are flexible enough to accommodate battlefield complexity and uncertainty.

Course of action development builds on the mission analysis hypothesis to create solutions to the problem. It is an iterative loop of additional mission analysis, course of action analysis to screen for FAS conditions, and informal COA comparison. This intuitive feedback process more accurately reflects the chaotic creative activity that occurs than does the current strictly linear, sequential process of MDMP. Figure 1 illustrates the overall flow of this revised MDMP, showing the interaction between the

---

<sup>90</sup> David K. Gerber, *Adaptive Command and Control of Theater Airpower*, 58-60.

commander and the staff along with the iterative COA development loop. Figure 2 illustrates the iterative COA development cycle.

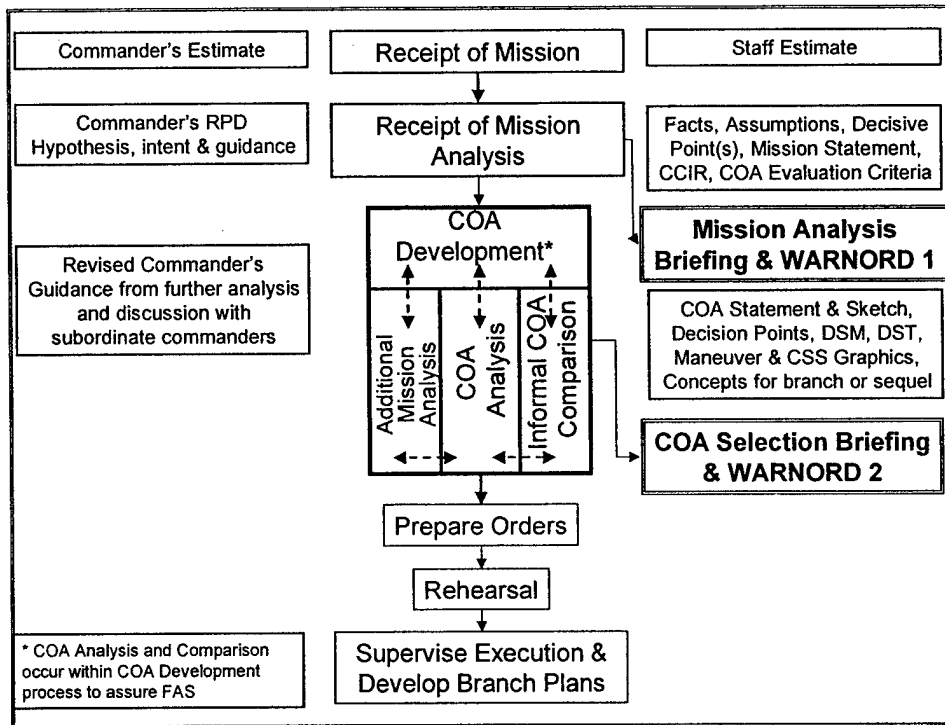
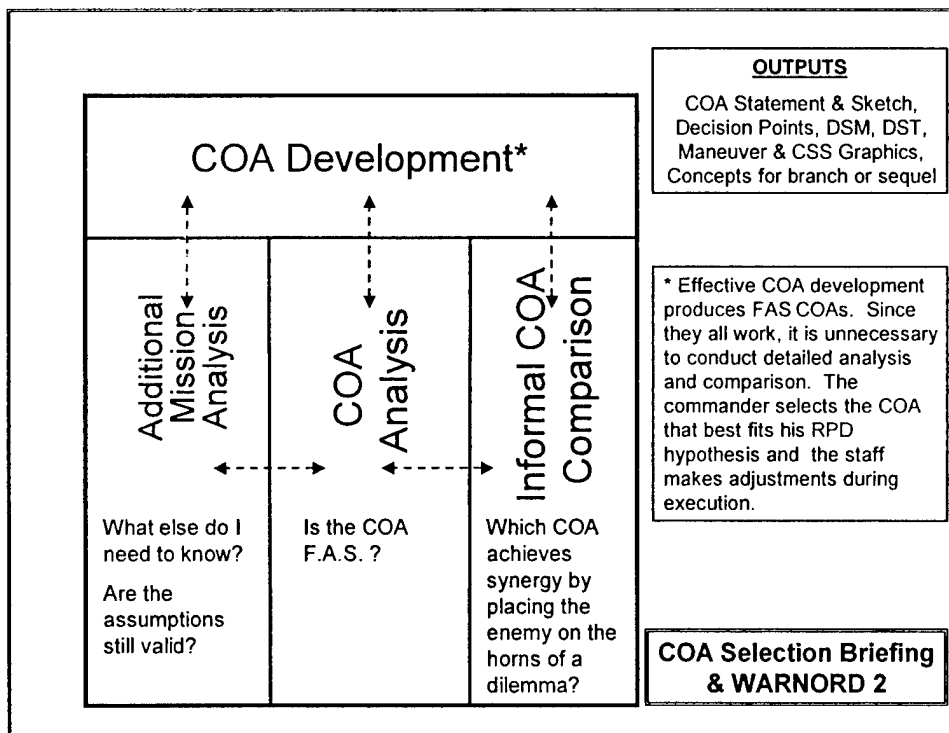


Figure 1 - Macro View of Revised MDMP



**Figure 2 -Iterative COA Development Cycle**

Course of action development should produce a COA sketch that illustrates the decisive point and the actions required to accomplish the decisive action using doctrinal graphic control measures and task symbols. The COA statement provides the concept of operation, verbal description of the decisive point and decisive action, and the key tasks that communicate simultaneous application of effects to the decisive point. COA development acknowledges battlefield complexity by creating mission-type orders for subordinate units and the control measures that provide coordinated action. It acknowledges uncertainty by using CCIR to seek only essential information required to support decision-making. COA development should also provide graphic control measures, a decision support matrix, and a decision support template to support execution of branch plans. Done effectively, COA development produces feasible, suitable, and acceptable plans that will all achieve the purpose of the operation. Since they will all

achieve the desired goal, and the opposing commander will inevitably adjust his actions during execution, detailed COA analysis and COA comparison adds little value to the planning process and may inhibit synchronization because the planners tend to become mired in excessive details. Detailed COA analysis can, however, be useful to refine the selected COA, but it is not necessary if the planners have addressed all the salient decision points when generating courses of action. Production and communication of the operations order is fairly straightforward, mechanistic process that needs no additional revision to achieve synchronization.

The MDMP is an effective process to generate shared understanding and the synthetic experience needed to synchronize operations. The recommended modifications will allow well-trained units to more rapidly and more effectively synchronize the effects of combat power to achieve advantage at the decisive point and achieve victory. These modifications acknowledge complexity, uncertainty, and naturalistic decision-making, making MDMP both more efficient and more effective.

## BIBLIOGRAPHY

### BOOKS

- Arquilla, John, and David Ronfeldt. *In Athena's Camp: Preparing for Conflict in the Information Age*. Santa Monica: Rand, 1997.
- \_\_\_\_\_. *Swarming and the Future of Conflict*. Santa Monica: Rand, 2000.
- Clausewitz, Carl. *On War*. Ed. and trans. Michael Howard and Peter Paret. Princeton: Princeton University Press, 1984.
- Dorner, Dietrich. *The Logic of Failure: Strategic Thinking for Complex Situations*. New York, New York: Metropolitan Books, 1989.
- Keyes, Jonathan, Richard St. Clair, and Robert Gray. *Bridging Decisions Into Solutions*. Kansas City: Woods & Waters Press, 1997.
- Klein, Gary. *Sources of Power: How People Make Decisions*. Cambridge, Massachusetts: The MIT Press, 1999.
- O'Hanlon, Michael. *Technological Change and the Future of Warfare*. Washington: Brookings Institution Press, 2000.
- Owens, William. *Lifting the Fog of War*. New York: Farrar, Straus, and Giroux, 2000.
- Peters, Ralph. *Fighting for the Future: Will America Triumph*. Mechanicsburg: Stackpole Books, 1999.
- Gareev Makhmut. *If War Comes Tomorrow*. London: Frank Cass, 1998.
- Scales, Robert H. *Future Warfare*. Carlisle: U.S. Army War College, 1999.
- Strange, Joe. *Centers of Gravity and Critical Vulnerabilities: Building on the Clausewitzian Foundation So That We Can All Speak the Same Language*. Quantico, VA: Marine Corps University Foundation, 1996.
- Sun Tzu. *The Art of War*. Ed. and trans. by Samuel B. Griffith. New York: Oxford University Press, 1971.
- Toffler, Alvin, and Heidi Toffler. *War and Anti-War: Survival at the Dawn of the Twenty-first Century*. Boston: Little, Brown and Company, 1993.
- Watts, Barry D. *Clausewitzian Friction and Future War*. Washington, D.C.: National Defense University Press, 1996.

War Department. *Field Service Regulations Operations*. Washington, D.C.: United States Government Printing Office, 1941. Reprint, Fort Leavenworth, KS: United States Army Command and General Staff College Press, 1992.

## **DOCTRINAL PUBLICATIONS**

Joint Chiefs of Staff. Joint Publication 1-02 *Department of Defense Dictionary of Military and Associated Terms*. Washington. Joint Electronic Library, 2000.

United States Army. Field Manual 100-5 *Operations*. Washington: Department of the Army, 1993.

\_\_\_\_\_. Field Manual 101-5 *Staff Organization and Operations*. Washington: Department of the Army, 1997.

\_\_\_\_\_. Field Manual 101-5-1 *Operational Terms and Graphics*. Washington: Department of the Army, 1997.

\_\_\_\_\_. Student Text 3-0 *Operations*. Washington: Department of the Army, 2000.

\_\_\_\_\_. Student Text 6-0 *Command and Control*. Washington: Department of the Army, 2000.

## **ARTICLES**

Alexander, Michael. "Does Better Intelligence Improve Foreign Policy Decisions?" *RUSI Journal* (October 1999). 1-6.

Ankersen, C.P. "Learning From Mistakes? The use and abuse of history in decision making." *RUSI Journal* (October 1998). 50-53.

Banner, Gregory T. "Decision Making: A Better Way." *Military Review* (September-October 1997), 53-55.

Benyon, Terry W., Carl Bird, and Burt D. Moore. "Wargaming: The Key to Planning Success." *Army Logistician* (November-December 1999), 4-9.

Herrmann, Richard K., Phillip E. Tetlock, and Penny S. Visser. "Mass Public Decisions to Go to War: A Cognitive-Integrationist Framework." *The American Political Science Review* (September 1999). 553-573.

Houghton, Susan M., Mark Simon, Karl Aquino, and Caren Goldberg. "No Safety in Numbers: Persistence of Biases and Their Effects on Team Risk Perception and Team Decision Making." (December 2000). 325-353.

Killion, Thomas. "Decision Making and the Levels of War." *Military Review* (November-December 2000). 66-70.

- Krulak, Charles C. "Cultivating Intuitive Decision Making." *Marine Corps Gazette* (May 1999). 18-22.
- Light, Ron. "Synchronizing the Plan: The Orders Crosswalk." *Engineer* (March 1999). 42-43.
- Mann, Hans. "Leadership." *Naval Forces* (2000). 28-30.
- Morningstar, James K. "Leadership in the XXI Century." *Armor* (September-October 2000). 37-39.
- Reinwald, Brian. "Tactical Intuition." *Military Review* (October-November 2000). 79-88.
- Rich, Robert F. "Rationality and Use of Information in Policy Decisions." *Science Communication* (December 2000). 173-211.
- Roper, Daniel S. "Peacetime Leadership: A Critical Element Of Combat Power." *Military Review* (May-June 1999), 71-76.
- Rose, Michael. "NATO is Fighting the Last Computer Battle." *Peacekeeping and International Relations* (March-April 1999). 2-4.
- Schmitt, John F., and Gary A. Klein. "Fighting in the Fog: Dealing With Battlefield Uncertainty." *Marine Corps Gazette* (August 1996). 62-69.
- Stratton, Matt. "Smart Soldiers." *Harvard International Review* (Fall 1998). 10-11.
- Sullo, Mark A. "Combat Decision Range Training." *Marine Corps Gazette* (February 1999). 37-38.
- United States Army Combined Arms Center. Center for Army Lessons Learned. *CTC Quarterly Training Bulletin 97-4 Special Edition Decision Point Tactics*. On-line. Internet 10 March 2001. Available from [http://call.army.mil/call/ctc\\_bull/97-4/chap1.htm](http://call.army.mil/call/ctc_bull/97-4/chap1.htm)
- \_\_\_\_\_. Center for Army Lessons Learned. *NTC TRENDS AND TTPs 3rd & 4th Qtrs, FY98, NO. 99-10*. n.p. On-line. Internet, 16 January 2001. Available from [http://call.army.mil/call/ctc\\_bull/99-10/ta4pt3.htm#8](http://call.army.mil/call/ctc_bull/99-10/ta4pt3.htm#8)
- \_\_\_\_\_. Center for Army Lessons Learned. *BCTP Perceptions '00*. n.p. On-line. Internet, 16 January 2001. Available from [http://call.army.mil/call/ctc\\_bull/](http://call.army.mil/call/ctc_bull/)
- Van Riper, Paul K., and F.G. Hoffman. "Pursuing the Real Revolution in Military Affairs: Exploiting Knowledge Based Warfare." *National Security Studies Quarterly* (Summer 1998). 1-19.



Winterfeld, Steven P. "Focused PIR." *Military Intelligence Professional Bulletin* (April-June 2000). 68-69.

Wyte, Joey. "Mission Analysis: Getting it Right." *Engineer* (February 1998), 31-33.

## MONOGRAPHS

Donohue, Kevin S. "The Dynamic Synchronization Matrix: An Automated Decision Support Tool for the Campaign Planning Staff." School of Advanced Military Studies Monograph, US Army Command and General Staff College, 1994.

Frame, J.E. "Gazing Into the Crystal Ball Together: Wargaming and Visualization for the Commander and Staff." School of Advanced Military Studies Monograph, US Army Command and General Staff College, 1996.

Fontenot, Gregory. "The Lucky Seventh in the Bulge: A case study for the Airland Battle." School of Advanced Military Studies Monograph, US Army Command and General Staff College, 1985.

Gerber, David K. *Adaptive Command and Control of Theater Airpower*. Maxwell AFB: Air University Press, 1999.

Lynch, Timothy D. "Operational Synchronization: A Revised Doctrinal Perspective." School of Advanced Military Studies Monograph, US Army Command and General Staff College, 1990.

Laughbaum, Kent. *Synchronizing Airpower and Firepower in the Deep Battle*. Maxwell Air Force Base. Air University Press, 1999.

Rodriquez, David M. "Task Force Synchronization: What is Essential." School of Advanced Military Studies Monograph, US Army Command and General Staff College, 1989.

Schoffner, W.A. "Military Decision Making Process: Time For Change." School of Advanced Military Studies Monograph, US Army Command and General Staff College, 2000.

Sevcik, Michael C. "Force XXI Technology and the Cognitive Approach to the Military Decision Making Process (MDMP)." School of Advanced Military Studies Monograph, US Army Command and General Staff College, 2000.

Sittnick, Stephen M. "Do the Operational Operating Systems Offer an Adequate Framework for the Synchronization of Combat Power at the Operational Level." School of Advanced Military Studies Monograph, US Army Command and General Staff College, 1993.

Smith, K.R. "Using the Same Decision Making Process for Joint and Army Operations." School of Advanced Military Studies Monograph, US Army Command and General Staff College, 1999.

Thompson, Michael R. "Is organization the Synchronization Problem? Battle Staff Organization of the Heavy Task Force." School of Advanced Military Studies Monograph, US Army Command and General Staff College, 1990.

Tuttle, Henry S. "The Use of Command and Control to Enhance the Agility and Achieve Synchronization on the Airland Battlefield." School of Advanced Military Studies Monograph, US Army Command and General Staff College, 1986.

Zanol, James E. "Heavy Division Synchronization: Impact of the Airland Battle – Future Concept." School of Advanced Military Studies Monograph, US Army Command and General Staff College, 1990.